

**(54) NAVIGATION DEVICE FOR VEHICLE**

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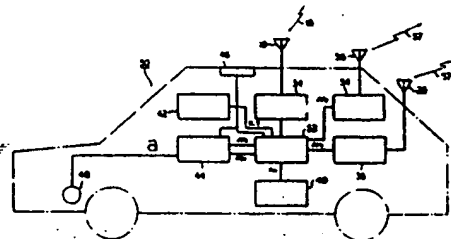
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(71) TOYOTA MOTOR CORP (72) TOSHIMASA MIKAWA

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**PURPOSE:** To eliminate fixed stations and correct GPS position measurement data, and to improve the position measurement accuracy by correcting the GPS position measurement data with correction data found by the navigation device of the this vehicle or external correction data.

**CONSTITUTION:** A GPS reception part 34 finds the distance to a GPS satellite with a received satellite radio wave 16 and then finds the GPS position measurement data from the distance. Then a control part 52 compares the current travel position of this vehicle determined with the position measurement data with the position of the closest intersection on map data at a recording part, converts it into travel position coordinates X and Y, and displays them on a screen, and data  $\Delta P_k$  is radiated 56 from a transmission part 54 with a mobile station radio wave 57. A reception part 36, on the other hand, receives another mobile station radio wave 57 through an antenna 26, and extracts and supplies correction data  $\Delta P_k$  to a control part 52. The control part 52 when inputting the correction data  $\Delta P_k$  does not calculate the correction data  $\Delta P_k$  by the navigation device 50 of this vehicle, but finds the travel position coordinates with the input data  $\Delta P_k$  and displays it.



36: reception part, 10: recording part, 42: display part,  
14: estimation navigation part, 46: azimuth sensor, 14:  
distance sensor, 52: control part, 54: transmission part,  
a: travel distance

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A. Page 4, lower right column, line 8 to page 5, upper right column, line 6:

In a vehicle navigation apparatus 50 according to the present invention, a control unit 52 has a map matching function. A transmission unit 54 and an antenna 56 for transmitting correction data to a vehicle navigation apparatus mounted on the other vehicle are also provided.

A GPS reception unit 34 receives a satellite radio wave 16 by an antenna 18, and demodulates it to generate a satellite signal. The GPS reception unit 34 further executes the GPS operation in accordance with the satellite signal. The GPS operation is to obtain a distance from a GPS satellite 10 and obtain the GPS positioning data on the basis of this distance. The GPS positioning data is supplied from the GPS reception unit 34 to the control unit 52. The control unit 52 stores a current running position Pn of a vehicle 14 determined in accordance with the GPS positioning data that is input from the GPS reception unit.

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34, and refers to the position  $P_n$ , in the map data stored in a memory unit 40.

The memory unit 40 supplies a point of intersection  $P_m$  that is nearest to the position  $P_n$  to the control unit 52. The control unit 52 operates correction data  $\Delta P_k$  on the basis of

$$\Delta P_k = P_n - P_m$$

The correction data  $\Delta P_k$  is converted into coordinates X and Y of the running position of the vehicle 14. The converted data is displayed on a screen of a display unit 42 together with the map data.

On the other hand, the correction data  $\Delta P_k$  is supplied to the transmission unit 54. The transmission unit 54 transmits the correction data  $\Delta P_k$  from the antenna 56 by use of a mobile station radio wave 57. The mobile station radio wave 57 is received by, for example, the vehicle navigation apparatus mounted on the other vehicle. The reception unit 36 also receives the mobile station radio wave 57 with the antenna 26 and demodulates it. The reception unit 36 further extracts the correction data  $\Delta P_k$  from the demodulation results and supplies the data to the control unit 52. When the control unit 52 inputs the correction data  $\Delta P_k$  from the reception unit 36, the control unit 52 does not operate the correction data  $\Delta P_k$  on the basis of the GPS positioning data, but determines and displays the running position coordinates X and Y on